Abstract

Label-Free DNA Detection with Capacitive Field-Effect Devices—Challenges and Opportunities [†]

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Field-effect EIS (electrolyte-insulator-semiconductor) sensors modified with a positively charged weak polyelectrolyte layer have been applied for the electrical detection of DNA (deoxyribonucleic acid) immobilization and hybridization by the intrinsic molecular charge. The EIS sensors are able to detect the existence of target DNA amplicons in PCR (polymerase chain reaction) samples and thus, can be used as tool for a quick verification of DNA amplification and the successful PCR process. Due to their miniaturized setup, compatibility with advanced micro- and nanotechnologies, and ability to detect biomolecules by their intrinsic molecular charge, those sensors can serve as possible platform for the development of label-free DNA chips. Possible application fields as well as challenges and limitations will be discussed.

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